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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,265	11/17/2003	Thomas Pun	APLE.P0037	6487

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EXAMINER

WERNER, DAVID N

ART UNIT	PAPER NUMBER
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2621

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/716,265	Applicant(s) PUN ET AL.	
	Examiner David N. Werner	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, steps of the claimed quantization method, for example as a flowchart, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because it exceeds 150 words in length. Correction is required. See MPEP § 608.01(b). Applicant is reminded that an abstract should not compare the invention with the prior art and should not include extensive design details.

4. The disclosure is objected to because of the following informalities: in page 5, lines 17 and 19, the ungrammatical phrase "the previous the buffer occupancy accumulator" appears, and in page 5, line 24, the phrase "will improved" does not agree in tense.

Appropriate correction is required.

5. The disclosure is objected to because it contains an embedded hyperlink in page 11, line 19. Applicant is required to delete the embedded hyperlink. See MPEP §

608.01. A proper reference to non-patent literature is filed in an Information Disclosure Statement in compliance with 37 C.F.R 97 and 98.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 4, 16, and 19 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 5, 6, 8, 9, 12, and 13 of copending Application No. 10/716,316. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of both applications are directed to the same concept of preventing overflow or underflow in a buffer in a video encoder by changing the scaling of the quantizer according to frame complexity. Therefore, the two inventions are obvious variants of each other.

Method claims 1 and 4 of the present invention are related to method claims 1, 2, 5, and 6 of the conflicting invention, and computer-readable medium claims 16 and 19 of the present invention are related to computer-readable medium claims 8, 9, 12, and 13 of the conflicting invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 2-4 and 6-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claims 2-4 each recite the limitation "the method of scaling digital video information as claimed in claim 1" in the start of the claims. There is insufficient antecedent basis for this limitation in the claims. Parent claim 1 recites "[a] method of quantizing digital video information".

11. Claims 6-13 each recite the limitation "the method of scaling digital video information as claimed in claim 5" in the start of the claims. There is insufficient antecedent basis for this limitation in the claims. Parent claim 5 recites "[a] method of quantizing digital video information".

Claim Rejections - 35 USC § 101

12. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

13. Claims 16-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The word "comprising" is not considered sufficient for linking a computer program with a computer-readable medium in statutory form. An acceptable form of the preamble of claim 16 reads, "A computer readable medium, said computer readable medium encoded with a set of computer executable instructions for performing the steps of:" and an acceptable form of the preamble of claim 20 reads, "A computer readable medium, said computer readable medium encoded with a set of computer executable instructions for implementing a video encoder by performing the steps of:". See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

14. Claims 1-28 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Although the specification is directed to a video encoder, and the claimed invention is a method and computer-readable medium for "quantizing digital video information", the steps claimed only teach setting quantization parameters, not an actual analog-to-digital conversion of data, or a resultant step with quantized data. Therefore, the claimed invention lacks a useful, concrete, and tangible result. See *Arrhythmia*, 22 USPQ2d 1033 and *AT&T*, 50 USPQ2d 1447.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-10 and 14-25 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,160,846 B1 (Chiang et al). Chiang et al. teaches a method and apparatus for encoding a video that selects a quantizing scale to maintain video quality. Regarding claim 1, Figure 1 of Chiang et al. shows encoder 100 with rate control module 130 that monitors and adjusts the bit rate of the data stream entering buffer 190 to prevent overflow and underflow (column 8, lines 48-55). Rate control module 130 adjusts the quantizer scale based on the complexity of a frame (column 8, line 64 – column 9, line 21), and attempts to maintain an optimal bit rate that preserves image quality (column 8, lines 56-63). Regarding claim 2, in one embodiment of Chiang et al., the coding model uses a regression technique to refine the complexity model that starts with a baseline assumption that frames of similar type have similar complexity (column 10, lines 34-49). Regarding claim 4, bit rate can be controlled by altering the scale of a quantizer (column 2, lines 1-8), and regarding claim 3, if scaling a quantizer is not sufficient to prevent overflow, an encoder may only transmit low-frequency coefficients of a coded bitstream (column 2, lines 10-12).

Regarding claim 5, in one embodiment of Chiang et al., rate control method 400, as shown in figure 4, computes a quantizer scale for each macroblock in a frame, based

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on the buffer fullness measure, which in turn is based on various frame properties (column 13, line 32 – column 14, line 11). Regarding claim 6, I-frames, P-frames, and B-frames have different target bit rates (column 13, lines 37-41). Regarding claims 7 and 8, the buffer fullness measure depends on the sum of bits generated by encoding the previous macroblocks in the frame (column 13, lines 53-54). Regarding claims 9, 10, 14, and 15, the encoding method calculates the distortion for each encoded macroblock, and checks if distortion is decreasing as the encoding progresses. If distortion is not decreasing, the target bit budget for the current frame type is adjusted according to a delta value (column 14, lines 12-46). Once again, since I frames, B frames, and P frames have different target bit budgets, the delta adjustment factor is different for intra (I-frame) macroblocks and inter (B-frame and P-frame) macroblocks.

Regarding claims 16-25, Chiang et al. discloses a software embodiment of the invention (claims 18-23).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 12, 13, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. Recall that the rejection of claim 5, the parent claim of claims 12 and 13, and claim 20, the parent claim of claims 27 and 28 is based on a

specific embodiment of the method of Chiang et al. The second embodiment, as shown in figure 4, actively adjusts a quantizer scale in a video encoder based on a buffer fullness measure. This embodiment does not mention clipping the quantizer scale to keep it in a certain range. However, another embodiment of Chiang et al. teaches a constraining modification for a quantizer scale. Method 200, according to a first embodiment of Chiang et al. and shown in figure 2, includes step 230 of calculating a modifier (γ) for quantizing step Q_i . Regarding claims 12 and 27, γ is a bit activity index ratio, calculated by dividing the estimated number of bits needed to encode the picture by the target number of bits (column 12, lines 29-32). Regarding claims 13 and 28, the bit estimation T_p is calculated as a weighted sum of the bits used to calculate each of the previous macroblocks in the frame (column 12, lines 19-28).

The second embodiment of Chiang et al. teaches the claimed invention except for constraining a quantizer scale in a certain range. The first embodiment of Chiang et al. teaches that it was known to constrain a quantizer scale based on an estimated encoded frame size. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to constrain the quantizer scale according to the second embodiment with a weighted modifier, since Chiang et al. states in column 11, lines 3-6 that such a modification would maintain a constant visual quality throughout an entire encoded picture.

19. Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang et al. in view of US Patent 7,079,581 B2 (Noh et al.). Claim 11 and 26

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teach adjusting a quantizer value in a video encoder based on the normalized sum of absolute differences. Although Chiang et al. teaches motion compensation, this is not necessarily factored into calculating a quantization scale. Noh et al. teaches an apparatus and method for controlling a variable bit rate for a video encoder in real time. Regarding claims 11 and 26, Noh et al. discloses a variable bit rate (VBR) controller that determines a quantization factor for a video encoder based on frame complexity (column 1, lines 45-56). Figure 1 of Noh et al. shows encoder 100 with VBR controller 50, which contains Mean Absolute Difference (MAD) calculator 51. The MAD value for a frame is directly used to model complexity of the frame (column 3, lines 48-49). This result is used as an input for target bit rate decision unit 52 and quantization factor decision unit 54 (column 3, lines 61-64).

Chiang et al. discloses the claimed invention except for determining a quantizer scale based on a sum of absolute differences. Noh et al. teaches that it was known to determine a quantization factor based on mean absolute difference. Therefore, it would have been obvious for one having ordinary skill at the time the invention was made to set a quantizer according to an absolute difference calculation as taught by Noh et al., since Noh et al. states in column 3, lines 31-34 that such a modification would "[minimize] deterioration of the quality of an image while increasing the encoding efficiency" (column 3, lines 31-34).

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- US Patent 5,164,828 A (Tahara et al.)
- US Patent 5,241,383 A (Chen et al.)
- US Patent 5,333,012 A (Singhal et al.)
- US Patent 5,469,208 A (Dea et al.)
- US Patent 5,790,196 A (Sun et al.)
- US Patent 5,937,138 A (Fukuda et al.)
- US Patent Application Publication 2002/0085636 A1 (Uenoyama et al.)
- US Patent Application Publication 2002/0163964 A1 (Nichols et al.)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DNW

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TC 2600